INTEGRATED PRODUCT TEAMS
and
INTEGRATED PRODUCT
&
PROCESS DEVELOPMENT

Tutorial

Applied Concurrent Engineering Conference

Nov 5, 1996
Seattle, Wa.

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WARNING-WARNING-WARNING

If you work with IPT/IPPD'S always remember:

- **The jargon is fuzzy.**
- **Its applications are context dependent.**
- **Principles & practices are still in-development.**
- **The technology is hard to keep up with.**
- **Culture change creates many uncertainties.**
- **You may not understand why it works when it does work.**
- **The "Cookbook" has not been written.**
- **In other words, its a *challenging, exciting* area that is open for *innovation and pushing the state-of-the-art*.**

SOME QUESTIONS TO CONSIDER!

- What are they?
- Why should we use them?
- How are they different?
- How long will they be around?
- Do they really work?
- How should they be used?
- How do we make them work?
- How can we measure their effectiveness?

WHAT IS AN IPPD?

IPPD (DoD)

- A management process that meets cost and performance objectives by:
  - using cross functional teams,
  - ***integrating all activities*** from product concept to field support,
  - simultaneously optimizing the product and its manufacturing and support processes.

IPPD (NCAT*)

- A management methodology that incorporates a systematic approach to the ***early integration*** and concurrent application of all disciplines that play a part throughout a system's life cycle.
  - focus on the front end of the Concurrent Engineering process
  - early integration of key product/process characteristics
  - highly dependent on Sciency and Technology

*National Center for Advanced Technologies

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Integrated Product Teams and Integrated Product & Process Development

IPT DoD Definition:

- Cross functional teams formed for the specific purpose of delivering a product for an external or internal customer.
- A group of individuals who:
  - have complementary skills.
  - are committed to a common purpose, approach and performance objectives.
  - hold themselves mutually accountable.

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General Information on IPTs

- They are being used at all levels in the acquisition process:
  - At the oversight level for ACAT ID programs with Overarching IPTs, Integrating IPTs and Working IPTs.
  - At the Navy oversight level for ACAT IC and below with equivalent IPTs, used to be called ACTs.
  - At the Program Office level to assist the PM in internally managing the program.
  - At the Program Office level to work with the Prime contractor in a joint government/contractor IPT.
  - At lower levels in both the Program Office and the Contractor to implement the acquisition efforts.
- To date almost all of the Program Offices are using IPTs effectively and have come well up on the learning curve. It is not used at some of the lower ACAT program levels because of size, phase of the acquisition process or it just does not make sense.
- IPT training is underway throughout the acquisition community, including contracted courses, DSMC and DAU courses.

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TEAM (Katzenbach & Smith*)

- A small group of people:
  - with complimentary skills.
  - committed to a common purpose, and a set of specific performance goals.
  - holding each other fully and jointly accountable for the team's results.
  - deeply committed to one another's personal growth and success.

*The Wisdom of Teams

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SO! WHAT'S INDUSTRY'S PROBLEM?

- History of industrial competition.
- Growth of information technology.
- Two year generation of new technology.
- Customers are custom, cost & quality driven.
- Time to market is critical.
- Workforce more highly educated.
- Competition is international.
- Robots did not save industry.
- Accounting systems not support smart decisions.
- Processes neither efficient nor effective.
- Sustainable Competitive Advantage = "The Impossible Dream"?
- Workforce hard working, mobile, affluent, well educated, individualistic, and sceptical.

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WHATS THE DEFENSE PROBLEM?

- History of success.
- Growth of information technology.
- Two year generation of new technology.
- Weapon systems complexity increasing.
- Budget cutbacks continue.
- Weapon system total ownership costs no longer affordable.
- Acquisition cycle takes too long.
- New, diverse and unpredicatble warfare scenarios.
- Workforce same as industry.

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SO WHAT SHOULD WE DO?

- Re-organize, that must help??
- Deny that the problem exists.
- Work harder. Or find the silver bullet!
- Push research in fundamental ways to do things better.
- Change our strategy for success.
  - Become more innovative and creative in solving problems.
  - Empower workers.
  - Alliances, not death battles.
- See if anyone, anywhere, anytime, has found solutions that could help us. i.e.
- Study the world class industry breakthroughs:

CUSTOMER	QUALITY	**CONCURRENCY**
EMPOWERMENT	**TEAMS**	PARTNERING
PROCESSES	CYCLE TIME	TECHNOLOGY
SYSTEMS THINKING	WASTE	TARGET PRICING

- **And learn how to use them for our own purposes.**

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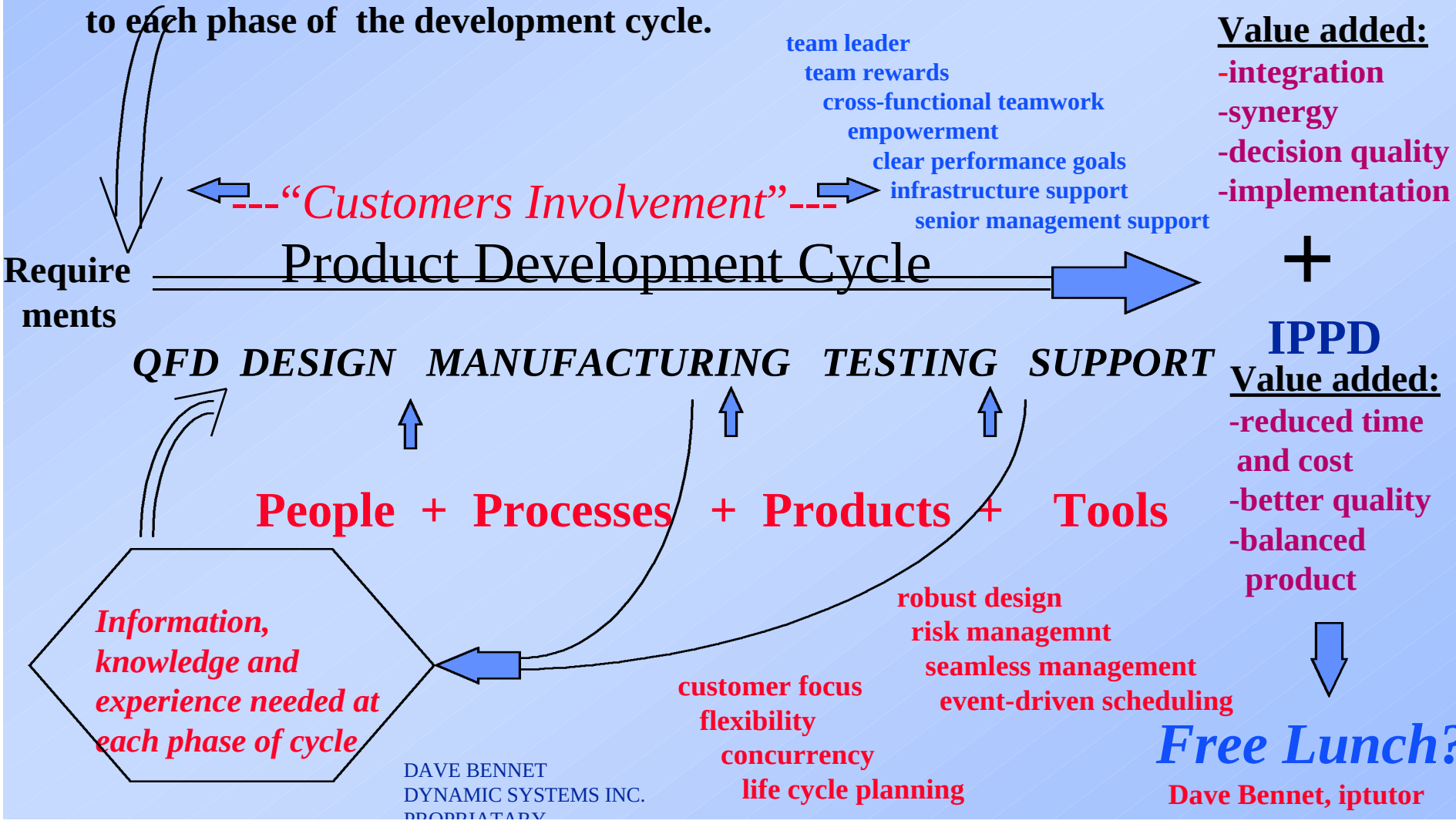
IPT/IPPD RELATIONSHIP

Program IPT team <u>identifies, processes, integrates, presents and applies</u> information, knowledge and experience of team members to each phase of the development cycle.



WHAT ARE DoD & INDUSTRY PERFORMANCE GOALS?

- Satisfied (delighted) customers.
- Maximum product performance.
- Minimum development & ownership cost.
- Short development time.
- Maximum system flexibility.
- Minimum risk of failure.
- Sustainable warfighting (competitive) advantage.

THESE ARE INCOMPATIBLE GOALS!!

BASIC PRINCIPLES

- Customers know what they want better than suppliers do.
- Collaboration gives better results than individuals.
- Systems thinking improves problem solving and decision making.
- Cost consciousness reduces waste and time.
- Processes drive product success.
- Workers know their job better than management.
- Technology supports people.
- Learning & change are critical to survival.

WHY SHOULD DoD USE IPT/IPPDs?

- DoD shall perform as many acquisition functions as possible, including oversight and review, using IPTs, in a spirit of teamwork, with participants empowered and authorized to the maximum extent possible to make commitments for the organization or functional area they represent.
- Involve key personnel early, and encourage timely decision-making.
- Promote flexible, tailored approaches to oversight and review based on mutual trust, while considering program size, risk, and complexity.

William J Perry
10 May, 1995

DoD POLICY OBJECTIVES

- Insight, not oversight.
- Prevention over cure.
- Early involvement of key people.
- Inclusive, not exclusive attendance at IPT's.
- Early identification and resolution of issues.
- Make sound and timely decisions and recommendations.
- Build successful and balanced programs.

WHY SHOULD WE USE IPTs?

- To better achieve performance goals.
- To integrate information, knowledge and experience.
- To create synergy through team dynamics.
- To get buy in for implementation.
- To develop more alternatives.
- To broaden team members' perspective and knowledge.
- To develop team learning and flexibility
- To accelerate networking.
- To facilitate culture change.

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WHY SHOULD WE USE IPPDs?

- Focus on customer's needs.
- Reduce unit and life cycle product costs.
- Facilitate better decisions.
- Reduce product developmental time.
- Balanced cost, schedule & performance tradeoffs.
- Processes support product development.
- Reduces risk via better understanding of product & processes.
- Improved quality from integration & continuous performance improvement.

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HAVEN'T WE BEEN DOING THESE?

- Most acquisition personnel have not been using IPTs, nor their contractors IPPDs.
- Technology support only over last decade.
- The infrastructure slow to change.
- Requires culture change in workforce and in management.
- New ways of doing business:

  Empowerment, open communications, tailoring of programs, prototyping, collaboration, reduced oversight, prevention over cure, partnering etc.

HOW LONG WILL THEY BE AROUND?

- What happened to MBO? To TQM/TQL?
- What is happening to Reengineering?
- What will happen to teams?
- Are IPT/IPPDs just another fad?
- Assuming the environment does not change:
  - Industry competitiveness will increase.
  - Acquisition pressure will continue.
- No alternatives on the horizon.
- We are just beginning to learn how to use IPT/IPPDs.
- And the learning curve is positive.

THEIR FUTURE IS UP TO US !!

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DO THEY REALLY WORK?
(is there a free lunch?)

- Payoffs and trends:
  - Cycle time reduction 50%.
  - Cost reduction by 40-50%.
  - Six sigma quality.
  - Technology applications spreading rapidly.
  - Empowerment and Teaming are the “in” thing.
  - Team based organizations are appearing.
  - Research and Conferences indicate success.
- Many DoN ACAT 1D programs using them.
- OSD using IPTs for insight and oversight.
- Many success stories in industry and DoN.
- Final DoD results not in.
- Indications are good!

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PRINCIPLES OF “IPT” OPERATION

- Open discussions with no secrets.
- Qualified, empowered team members.
- Consistent, success-oriented, proactive participation.
- Continuous up-the-line communications.
- Reasoned disagreement.
- Issues raised and resolved early.

HOW SHOULD THEY BE USED?

- IPTs are used for oversight, management, program implementation, engineering, production, testing and support.
- IPPDs used for developing a product, or process.
- Careful assessment of context and objectives needed.
- Collaboration and support from other organizations.
- Industry needed a significant emotional experience before going to IPT/IPPDs.
- They should be used only when their application will improve the achievement of performance goals.

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BARRIERS TO IPPD EFFECTIVENESS?

- Complexity of products/processes developed.
- Skill needed for implementation.
- Required culture change.
- Lack of infrastructure support.
- Lack of training available.
- Up-front higher cost.
- Slow learning curve.
- Tool interoperability.
- Legacy stovepipe education and organizational structure.
- Senior management backing.
- Large capital investment in place.
- Lack of integration of people, processes, tools & products.

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HOW CAN WE MAKE IPPDs WORK?

- Recognize proposal quality and past performance.
- Work with contractors for mutual success.
- Do not legislate or demand that contractors use IPPDs.
- Utilize tools, people and processes to achieve performance goals.
- Ensure everyone understands contract requirements, facilitates issue resolution and has early insight into contractor performance.
- IPT guidance cannot change the contract requirements.
- Reduce government oversight and non-value added requirements and data on contractors.
- Learn and apply the tenets of IPPDs.
- Better game plan & better teamwork.

Leadership is not rank, privileges, titles, or money. It is responsibility.
Peter Drucker, 1996

BARRIERS TO IPT EFFECTIVENESS?

- Inappropriate use of teams.
- Top management not back team.
- Fuzzy team vision, mission, direction.
- Lack of clear, stretch performance goals.
- Fall of the authority balance beam.
- Lack of organizational support.
- Leader manages team as individuals.
- High workload from other duties.
- Lack of team member empowerment.
- Inadequate use of technology.
- Assuming everyone has the competence to work well as a team.

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HOW CAN WE MAKE IPTs WORK?

- One size does not fit all. Many types of IPTs.
- Keep team size down to 15.
- Have good meeting mechanics.
- Link teams to performance.
- Start up period is critical & team leader is a potent force.
- Collocate; get to know each other; trust & openness.
- Meet frequently, effective teams take time.
- Attitude very important, a self fulfilling prophecy.
- Time limits pull team together.
- Get initial & JIT training, then team development.
- Communicate, communicate, communicate.
- Recognize and manage the culture change.

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THE CHALLENGE AND THE PAYOFF

The integration of data, information, knowledge and action.

- The silver bullet of IPT?IPPD application.
- Very hard to do well!
- Game plan is to plan and make decisions early to minimize downstream problems.
- Teamwork significantly improves decision quality and implementation effectiveness.

WHAT IS A HIGH PERFORMING IPT?

- Focused on collective performance.
- Committed to a common purpose.
- Members have complementary skills.
- High trust and open communication.
- High degree of mutual interdependence.
- Individual's goals congruent with team goals.
- Members feel strongly about the team.
- Low power differentiation among team members.
- Members create synergy to find win-win results.
- Disagreements encouraged in dialogue.
- Members deeply committed to each others' personal growth and success.

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HOW CAN WE MEASURE PERFORMANCE?

- Measure product outcomes:

  Performance Cost Schedule Risk flexibility

- Measure team/IPPD processes:

Meeting mechanics.	Contracting	CAIV
Decision making.	Oversight	Design
Problem solving.	Manufacturing	QFD
Conflict management.	Risk management	Testing
Brainstorming.	Prototyping	Earned value

- Measure image and reputation:
  - Get feedback from customers
  - Talk to stakeholders and peers
  - Get feedback from senior management.
- Measure team member professional growth and satisfaction:
  - Interviews with team members.
  - 360 degree evaluations.
- Measure team self-assessment:
  - Test instruments
  - Interviews with team members

You can't manage what you cannot measure.

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CRITICAL SUCCESS FACTORS OF IPTs?

- **ARE WE GOING IN THE RIGHT DIRECTION?**
  - Nature of external forces
  - Nature of internal forces
- **HOW MUCH FREEDOM DO WE HAVE TO DO THE JOB?**
  - Member empowerment
  - Internal capability
- **HOW MUCH DO WE WANT TO DO THE JOB?**
  - Team motivation level
  - Shared beliefs
- **HOW WELL CAN WE WORK TOGETHER?**
  - High performance markers
  - Team processes
  - Group dynamics
  - Meeting mechanics
- **HOW GOOD ARE WE INDIVIDUALLY?**
  - Collaborative culture
  - Goal congruence
- **HOW WELL CAN WE ADAPT TO CHANGES?**
  - Team flexibility
  - Team learning capability

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SO WHAT SHOULD WE DO?

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  - Systems thinking Mantech 9 sigma set design agility virtual leadership
- Change our strategy for success.
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OUR WORLD OF ACQUISITION

- History of success.
- Growth of information technology.
- Two year generation of new technology.
- Weapon systems complexity increasing.
- Budget cutbacks continue.
- Weapon system life cycle costs rising.
- Acquisition cycle too long.
- New warfare scenarios.
- Workforce more highly educated.
- World class industry breakthroughs:

CUSTOMER	QUALITY	**CONCURRENTLY**
EMPOWERMENT	**TEAMS**	PARTNERING
PROCESSES	CYCLE TIME	TECHNOLOGY

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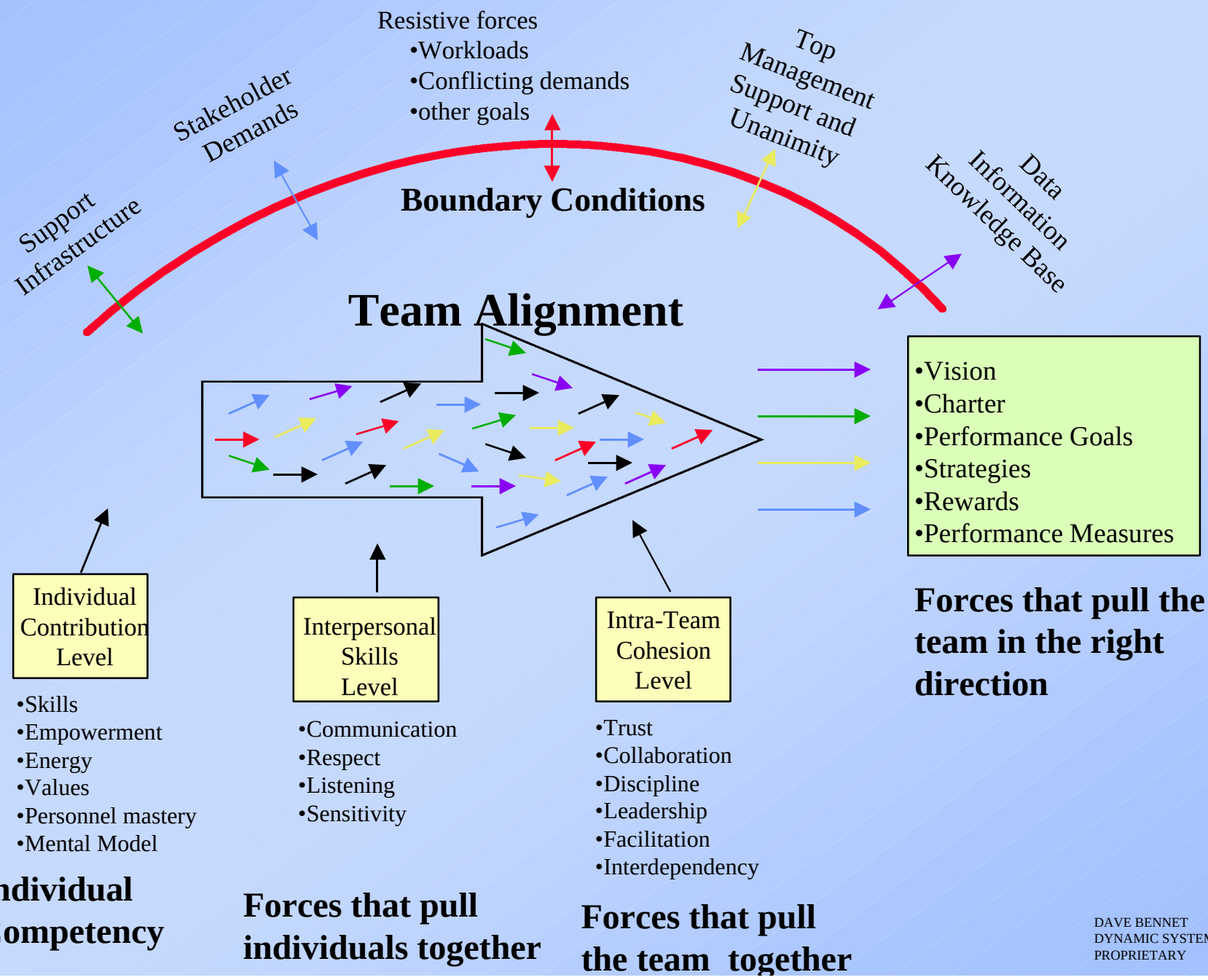
High Performance Team Model



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WHAT ARE THE CRITICAL SUCCESS FACTORS OF AN IPT?

- **TEAM EFFECTIVENESS**
  - High performance markers
  - Team processes
  - Group dynamics
  - Meeting mechanics
- **TEAM MEMBERS**
  - Collaborative culture
  - Goal congruence
- **TEAM ALIGNMENT**
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IPT/IPPD RELATIONSHIP

Program IPT team identifies, processes, integrates, presents and applies information, knowledge and experience of team members to each phase of the development cycle.

IPT

Value added:

- **integration**
- **synergy**
- **decision quality**
- **implementation**

+

IPT

Product Development Cycle

IPPD

QFD DESIGN MANUFACTURING TESTING SUPPORT

People + Processes + Products + Tools

Information, knowledge and experience needed at each phase of cycle

IPPD

Value added:

- **reduced time and cost**
- **better quality**
- **balanced product**

Free Lunch

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